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FAX

TO: Mark Schaefer, Deputy Assistant Secretary - Water and Science

FROM: Barry D. Gold, Acting Chief, GCMRC

SUBJ: Materials for the January 12, 1999 AMWG meeting.

AMWG
1/12-13/99

MARK - Attached to this FAX are two documents.

1. The first is the current version of the options slide. This has been reviewed by Steve Magnussen and Bob Winfree. I am waiting input from Bob Hirsch, Denny Fenn, and Charley Calhoun. (Attachment 1)

2. The second is a copy of the Issue Paper I sent you earlier with Steve Magnussen's comments shown in red-line and strike-out mode. I would like to get your final edits on this and then distribute it to the management team. Both Steve and I think it would be useful to discuss this paper, Monday night in Phoenix, before going into the AMWG meeting on Tuesday. (Attachment 2)

PLEASE call me later today once you have had a chance to review both of these documents.

Number of pages including this cover sheet: 16FAXED 1-4-99
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GCMRC'S INSTITUTIONAL HOME¹

SCREENING CRITERIA:

The selection of a permanent institutional home for GCMRC must strike the appropriate balance among at least the following three factors:

- (1) the objectivity and credibility of GCMRC scientific activities;
- (2) the relevance and responsiveness of GCMRC scientific activities to management objectives and information needs; and
- (3) the cost-effectiveness and efficiency (including timeliness) of GCMRC scientific activities.

OPTIONS:

Management Agency Lead

Bureau of Reclamation:

- reporting to the Regional Director for the Upper Colorado region who has responsibility for managing Glen Canyon dam, or
- reporting to an office within Reclamation with agency wide responsibilities (e.g., Washington office, Denver office, a new office of adaptive management)

National Park Service:

- reporting to the Grand Canyon Science Center at Grand Canyon National Park, or
- reporting to the Cooperative Ecosystem Studies Unit (CESU) at Northern Arizona University;

Science Agency Lead

U.S. Geological Survey (USGS):

- reporting to the Office of the Director, or
- reporting to the Chief of the Biological Resources Division (formerly the National Biological Service), or
- reporting to the Western Regional Director, USGS

Inter-agency Lead

- GCMRC Chief in USGS and GCMRC staff in Reclamation

¹"To support the designee and the AMWG, it is recommended that the Secretary establish a research center [GCMRC] within the U.S. Geological Survey (USGS) and/or National Biological Service with a small permanent staff in Flagstaff, Arizona." (GCDEIS, pg. 36)

Third DRAFT For Review
by the
GCMRC Management Team
(Mark Schaefer, Denny Fenn, Bob Hirsch, and Steve Magnussen)

ISSUE PAPER: THE LOCATION OF GCMRC WITHIN DOI

INTRODUCTION

Definition of Adaptive Management

Adaptive management (AM) is intended to be a formal, systematic, and rigorous approach to learning from the outcomes of management actions, accommodating change, and improving management (Holling, 1978). It involves synthesizing existing knowledge, exploring alternative actions, and making explicit forecasts about their outcomes. AM requires management actions and monitoring programs to be carefully designed to generate reliable feedback and clarify the reasons underlying outcomes. (Taylor, 1997).

According to Lee (1993),

“An adaptive policy is one that is designed from the outset to test clearly formulated hypotheses about the behavior of an ecosystem being changed by human use. In most cases these hypotheses are predictions about how one or more important species will respond to management actions.”

AM embraces uncertainty and acknowledges that the “best” management action is currently unknown. It permits learning from a management action, so that future management actions can proceed from a better knowledge base.

Adaptive Management as stated in the final EIS

As stated in the Final Environmental Impact Statement on the Operation of Glen Canyon Dam (GCDEIS, Reclamation, 1995),

“It is intended that the [Record of Decision] ROD will initiate a process of ‘adaptive management’ whereby the effects of dam operations on downstream resources would be assessed and the results of the resource assessments would form the basis for future modifications of dam operations. Many uncertainties still exist regarding the impacts of water releases from Glen Canyon Dam (GCD). The concept of adaptive management is based on the recognized need for operational flexibility to respond to future monitoring and research findings and varying resource conditions.” (Pg. 34)

Implementation of Adaptive Management within the GCDAMP

Within the Glen Canyon Dam Adaptive Management Program (GCDAMP), understanding derived from conceptual modeling, monitoring, and research efforts are used to predict how the resources of interest will both interact and respond to proposed management actions. The resources of interest, and appropriate environmental parameters, within the Colorado River ecosystem¹ are monitored to see if they respond to the management actions as predicted. Learning takes place as a result of the monitoring and research, and changes in the management actions are proposed in response to the new knowledge or insights regarding the functioning of the Colorado River ecosystem.

What is unique about an AM approach to natural resources management is not simply the existence of a feedback loop between the management action and outcome, but rather the use of modeling and implementation of a long-term monitoring and research program with an explicit experimental design that has appropriate controls² and statistical power required to test hypotheses: that is to determine if the management action does in fact have the desired (predicted) effect.

PRINCIPLES OF ADAPTIVE MANAGEMENT

At a recent science forum organized by the Ontario Ministry of Natural Resources (1998) about two-dozen practitioners gathered to present papers and discuss their experience with the implementation of adaptive management programs across North America. A number of themes

¹The "Colorado River ecosystem" is defined as the Colorado River mainstem corridor and interacting resources in associated riparian and terrace zones, located primarily from the forebay of Glen canyon Dam to the western boundary of Grand Canyon National Park, a distance of approximately 300 river miles.

² "Reliable knowledge comes from two procedures: controls and replication. A control matches what one is changing (the treatment) to a companion case in which that same factor is left unchanged (the control). The use of controls permits insight into whether it is the treatment that is causing the effect one sees, rather than something else such as a change in the weather. Replication is essential because if knowledge is reliable it can be shown to work more than once; real relationships between cause and effect will show up consistently." (Lee 1993)

emerged which might constitute a set of principles for implementing adaptive management programs. These include³:

- stakeholder participation (i.e., the concept of sharing decision making with citizens);
- embracing uncertainty and developing a strategic approach to deal with uncertainty (i.e., acknowledging that not enough is known to prescribe a set of best practices which can be implemented to achieve a set of management objectives);
- flexibility and willingness on the part of managers to treat management actions as experiments subject to modification;
- using a modeling approach as a common framework for understanding and to develop “predictive”⁴ hypotheses about the response of the system to a given set of management actions;
- partnership between managers and scientists to accelerate effective learning;
- know who you are, respect and maintain a clear separation between the roles and responsibilities of managers and scientists;
- a champion within management to support adaptive management when the sledding gets rough and to sustain a long-term commitment to the approach;
- ownership on the part of managers for the outcome of the adaptive management process;
- trust between managers and scientists built through communication, communication, communication;
- development of an applied monitoring and research program that is relevant to the needs of managers;
- the creation of a “skunkworks” which fosters scientific creativity in addressing management questions;

³Note, these are not presented in any order of importance.

⁴Predictive as it is used here is more aptly described as a forecast than a precise prediction in the engineering sense.

-- an appropriate and supportive legal framework;

-- commitment to support long-term monitoring and research activities; and

-- ensuring that processes are in place so that all stakeholders will embrace the scientific results of adaptive management as objective and unbiased.

THE GCMRC AND THE GCDAMP

The Grand Canyon Monitoring and Research Center (GCMRC) was established by executive directive of the Assistant Secretary for Water and Science on November 11, 1995 as one element of the GCDAMP called for in the Grand Canyon Protection Act of 1992 (GCPA), the GCDEIS, and the ROD. The elements of the GCDAMP (Figure 1) include the Secretary of the Interior, Secretary's Designee, Adaptive Management Work Group (AMWG), Technical Work Group (TWG), GCMRC, and Independent Review Panel(s).

The GCDEIS (pg. 36) recommended,

"... that the Secretary establish a research center [GCMRC] within the U.S. Geological Survey (USGS) and/or National Biological Service with a small permanent staff in Flagstaff, Arizona."

This recommendation was based on a number of factors including concerns by the stakeholders regarding the existing GCES program and the desire that the research center be established independent of the management agencies as a means of ensuring the objectivity of the scientific information developed by the research center.

Mission of GCMRC

The mission of the GCMRC is:

"To develop and implement long-term monitoring and related research and other scientific activities to determine "... the effects of the Secretary's actions ..."⁵ on the natural, recreational, and cultural resources of the Colorado River ecosystem, as well as

⁵As specified in the 1992 GCPA and reflected in the Record of Decision of the Glen Canyon Dam EIS (USDOJ 1996).

other information needs specified by the AMWG, utilizing an ecosystem science approach.”⁶

Ensuring Objective Quality Science. Relevant to the Needs of Stakeholders

Based on the language contained in the GCDEIS, the recommendations of the National Research Council (1996) which reviewed the GCES program, as well as GCMRC reviews of the experience in the Pacific Northwest with adaptive management, GCMRC established with the AMWG a set of protocols to ensure the objectivity and quality of its scientific activities. These include:

1) a competitive process for initiating the majority of the scientific work conducted by GCMRC:

As recommended by the NRC (1996), GCMRC implemented a competitive proposal solicitation process open to government employees, public-section contractors, and universities through an open Request for Proposals (RFPs). Monitoring and research projects are selected on the basis of their support of scientific capability and merit, submission timeliness on previous work (as evaluated through an independent, objective and unbiased peer review process), management objectives and information needs, demonstrated capabilities of proposers, and cost effectiveness. Following the selection of proposals, appropriate procurement mechanisms (i.e., grants, contracts, cooperative agreements) are utilized for supporting selected projects.

2) an independent external peer review process for all GCMRC scientific activities:

GCMRC’s commitment to ensuring the high quality of the scientific information produced by its programs highlights the importance of peer review at all levels of GCMRC scientific activities. GCMRC is committed to the use of scientific peer review and has developed a set of peer review guidelines, consistent with the “U.S. Department of the Interior Guidelines for Scientific Peer Review of Research” issued by the Secretary of the Interior, which describe the level of review received by all GCMRC proposals, programs, publications, and other

⁶The report language which accompanies the GCPA makes it clear that the focus should be effects on downstream resources.

products; and clearly convey the unambiguous standard of scientific objectivity and credibility followed by GCMRC.

These guidelines for scientific peer review ensure that GCMRC matches the level of peer review to the nature of the proposal, program, publication or other product being reviewed, and describe the selection of qualified scientific peers, independence of the review process, and the explicit inclusion of external (i.e., outside GCMRC) reviewers.

3) the establishment of a science advisory board (SAB)⁷:

To ensure that the long-term monitoring and research activities initiated by GCMRC are unbiased and objective, scientifically sound, and focused on the most important issues, an independent Scientific Advisory Board (SAB) is being established to advise the GCDAMP on the coordination and planning of monitoring and research programs, and to review the results of GCMRC's monitoring and research programs. The SAB is synonymous with the Independent Review Panel(s) specified in the GCDEIS (Reclamation, 1995).

The SAB will be an interdisciplinary board, composed of scientists who are qualified, based on their record of scientific achievement, in a range of disciplines related to the work of GCMRC. Scientists will be selected for their expertise and not as representatives of a particular agency, organization, or other stakeholder group.

4) develops all research activities in relation to AMWG management objectives and information needs with subsequent TWG/AMWG review:

GCMRC solicits extensive stakeholder involvement in developing monitoring and research agendas and has religiously used the management objectives and information needs adopted by the AMWG as the basis for all scientific activities. GCMRC has also prepared a

⁷As noted in Upstream: Salmon and Society in the Pacific Northwest, "The intent of the SAB is to allow scientific learning and analysis to occur independently of the political pressure of interest groups. Its job is to increase the efficiency and quality of the science available to inform policy and management decisions. Its membership must be chosen in a way that will give it credibility in the eyes of the people and institutions of the region. It must be independent. Although it must be independent, it must have a mechanism for being responsive to the concerns of people with local knowledge, interest, and concerns. Finally, its reports must be visible and accessible to all. Although the advisory board will not and should not make policy decisions, its scientific advice must be loud and clear enough that it cannot be ignored by accident."

long-term (5-year) monitoring and research plan for FY 1997 - 2002 which was reviewed by the TWG and the AMWG recommended that it be adopted by the Secretary. From this strategic plan, annual monitoring and research plans are developed which undergo a similar review. None-the-less, the fragile nature of this process is evident in the workings of the GCDAMP.

SCREENING CRITERIA FOR SELECTING A PERMANENT LOCATION OF GCMRC

The GCDAMP and GCMRC are at a critical stage in their development. There is a palpable air of fragility concerning the future success of the GCDAMP and any location of GCMRC must ensure the confidence of the stakeholders concerning:

- (1) the objectivity and credibility of GCMRC scientific activities;
- (2) the responsiveness of GCMRC scientific activities to management objectives and information needs; and
- (3) the cost-effectiveness and efficiency of GCMRC scientific activities.

Clearly, the decision with respect to an institutional home for GCMRC must strike the appropriate balance among at least these three factors: the objectivity and credibility of the scientific information developed by GCMRC, the relevance and responsiveness of the work conducted by GCMRC to the AMWG management goals and information needs, and the cost-effectiveness and efficiency of GCMRC scientific activities.

OPTIONS FOR GCMRC'S INSTITUTIONAL HOME

Before GCMRC could be established within the National Biological Service (NBS), NBS was consolidated within the U.S. geological survey (USGS) as the Biological Resources Division. Subsequently, the decision was made to temporarily house GCMRC within the Office of the Assistant Secretary for water and Science. Since then, a number of possibilities have been proposed as a permanent institutional home for GCMRC.

These include:

Management Agency Lead

1. Bureau of Reclamation:

- reporting to the Regional Director for the Upper Colorado region who has responsibility for managing Glen Canyon dam, or
- reporting to ~~another~~ an office within Reclamation with Agency wide responsibilities (e.g., ~~Commissioner, Operations, PAO, Washington office, Denver office,~~ a new office of adaptive management)

2. National Park Service: Grand Canyon National Park and Glen Canyon National Recreation Area;

Science Agency Lead

3. U.S. Geological Survey (USGS);

- reporting to the ~~a new office of adaptive management within the~~ Office of the Director, or
- reporting to the Chief of the Biological Resources Division (formerly the National Biological Service), or
- reporting to the Western Regional Director; and

Inter-agency Lead

4. ~~Office of the Assistant Secretary for Water and Science. GCMRC Chief in the USGS and GCMRC staff in Reclamation.~~

Discussion of Pros and Cons

Option 1 - Reclamation.

Objectivity and credibility: This option could raise concerns among some stakeholders regarding the objectivity and credibility of the work performed by GCMRC. ~~Their concerns being that the~~ GCMRC would no longer be viewed as an "independent" scientific organization, at arms length from one of the key management agencies; ~~and not~~ ~~Not~~ meeting the test of independence from the management agencies could have the potential to compromise the

credibility of GCMRC which is critical to the success of the overall AMP. ~~GCMRC would be viewed as holding a position that invariably favored Reclamation's interests above other stakeholders. Other stakeholders would make the point~~ Alternatively, it could be argued that the protocols GCMRC has developed are sufficient to ensure the objectivity and credibility of the work performed by GCMRC. Having GCMRC report to an office other than that of the Regional Director of the Upper Colorado Region ~~and retaining the SL rank for the Chief might [BOR does not have "SL" positions - SM.]~~ could bolster the view of some that GCMRC could operate independently.

Responsiveness and Relevance: Having GCMRC within Reclamation would ensure a vital connection between GCMRC and the management agency intended to be the key beneficiary of its activities and with the primary responsibility for implementing the recommendations resulting from GCMRC's work. This would also facilitate a smooth budget process, since GCMRC's funding is received from power revenues within Reclamation's budget.

Cost effectiveness: Whatever institutional home is selected, stakeholders will be concerned about the cost-effectiveness of the administrative support provided to GCMRC.

Other: Reclamation is likely to initiate at least 4 more adaptive management programs (Lower Colorado River, Trinity River, North Platt, and Bay-Delta) in the coming years and ~~could establish having an Office of Adaptive Management within Reclamation would allow Reclamation to play a leadership role within Interior with respect to adaptive management.~~

Option 2 - NPS.

Objectivity and credibility: As with option 1, this option could raise concerns among some stakeholders with regarding the objectivity and credibility of the work performed by GCMRC. ~~This concern being that the~~ GCMRC would no longer be an "independent" scientific organization, at arms length from one of the key management agencies: ~~and not~~ Not meeting the test of independence from the management agencies could have the potential to compromise the credibility of GCMRC which is critical to the success of the overall AMP. ~~Other stakeholders~~

~~would make the point. Alternatively, it could be argued that the protocols GCMRC has developed are sufficient to ensure the objectivity and credibility of the work performed by GCMRC. Having GCMRC report to an office other than that of the Superintendent of Grand Canyon National Park and retaining the SL rank for the Chief might bolster the view of some that GCMRC could operate independently. [Need feedback from NPS before using this concept. SM].~~

Responsiveness and Relevance: Having GCMRC within NPS would ensure a vital connection between GCMRC and a management agency with a strong stake in the recommendations resulting from GCMRC's work. This would put GCMRC at arm's length from Reclamation's budget process and ~~the source of funding could be an issue for some stakeholders. a mechanism would have to be worked out to ensure continued funding for GCMRC's activities from power revenues within Reclamation's budget.~~

Cost effectiveness: Whatever institutional home is selected, stakeholders will be concerned about the cost-effectiveness of the administrative support provided to GCMRC.

Option 3 - USGS.

Objectivity and credibility: This option is the most consistent with the language of the GCDEIS and with Secretary Babbitt's concept of establishing science activities at arm's length from the management agencies to ensure the objectivity and credibility of those science activities. ~~Many~~ ~~Some~~ of the GCDAMP stakeholders would embrace the objectivity and credibility of GCMRC's work as a result of placing it in USGS. ~~However, some would question GCMRC's objectivity and whether the Secretary's goals for the GCDAMP and their goals are consistent. [Not clear what this means, strike or rewrite - SM.]~~

Where within the USGS, GCMRC would be placed is also a critical issue. Having GCMRC report to an office of adaptive management at the level of the Director could create the capacity to support other adaptive management activities developing within Interior. Having

GCMRC report to the Chief of the Biological Resources Division would send a strong message that this program is important to the Secretary.

Responsiveness and Relevance: Having GCMRC within USGS would place it at arm's length from the management agencies who would be required to use the recommendations resulting from GCMRC's work and could create barriers to the acceptance of GCMRC's work. However, utilizing the protocols GCMRC has developed for stepping down its research plans from the management objectives and information needs as well as the TWG review of its strategic and annual research plans could counteract that perspective. This would put GCMRC at arm's length from Reclamation's budget process ~~the source of funding could be an issue for some stakeholders. and a mechanism would have to be worked out to ensure continued funding for GCMRC's activities from power revenues within Reclamation's budget.~~

Cost effectiveness: Whatever institutional home is selected, stakeholders will be concerned about the cost-effectiveness of the administrative support provided to GCMRC. Stakeholders have expressed concerns over the cost of USGS activities as well as the timeliness of their work products.

Other: USGS would need to embrace the science protocols (competition, independent external peer review, SAB) developed by GCMRC and the AMWG which may be in conflict with existing policies.

Option 4 - Status quo Inter-agency Lead.

~~Having the GCMRC Chief in the USGS and the rest of the staff in Reclamation reporting to a 3 person management committee for the Assistant Secretary water and Science, the USGS, and Reclamation is a somewhat unique but workable structure.~~ For some stakeholders, this is the only option with which they will be comfortable. They do not believe the GCDAMP has matured to the point that it can be housed within an agency, and they express the need for input and guidance at the level of the Secretary. ~~Recently, the stakeholders have been unable to agree on the scope of the AMP and the role of GCMRC in preparing the~~

update of the Strategic Plan. Until these issues are resolved satisfactorily, this option may need to be continued. At the same time, other stakeholders have raised concern's that the Secretary's goals for the GCDAMP and their goals for the GCDAMP may not be consistent. [What does this mean? Either strike or rewrite. SM] A similar concern is raised about interpretation of the statutory and legal authority under which the GCDAMP was established and GCD is operated. This option also side steps the issue of what agency would house the GCMRC FTEs. [Why is this an issue? SM.] In addition, it This option could also leaves the future of the GCDAMP and GCMRC vulnerable to changes in political leadership and philosophy. A decision on which agency should recruit for the Chief of the GCMRC should be made soon to provide the necessary leadership for the Center. This option would have the USGS doing the recruiting.

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The Adaptive Management Program and processes for determining future operations of Glen Canyon Dam

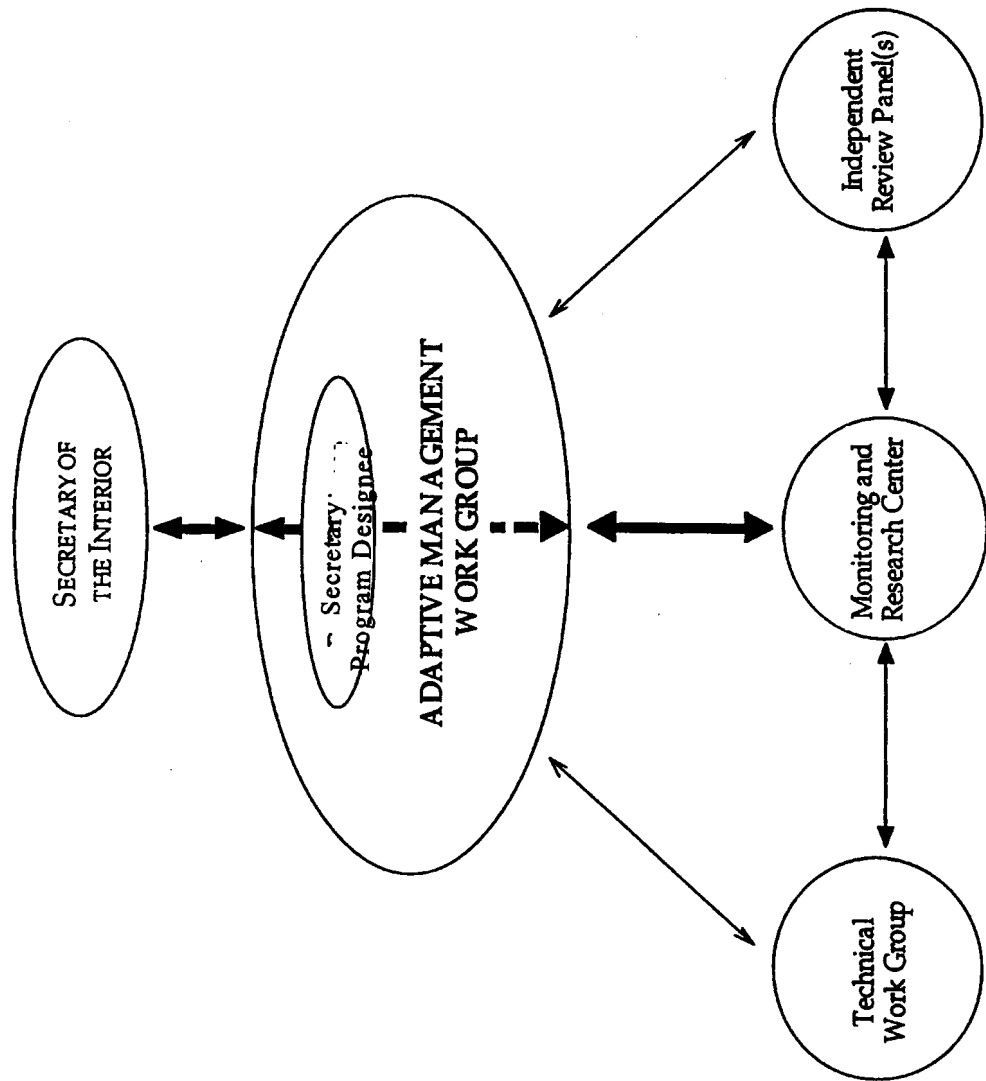


Figure 1. The Glen canyon Dam Adaptive Management Program and processes for determining future operations of Glen Canyon Dam.